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plained, for intelligent volition is shown to be a true cause of bodily movement, seeing that the cerebration which it involves would not otherwise be possible. This monistic theory thus serves to terminate the otherwise interminable controversy on the freedom of the will; for the theory shows it to be merely a matter of terminology whether we speak of the mind or of the brain as the cause of bodily movement. That particular kind of physical activity which takes place in the brain could not take place without the occurrence of volition, and *vice versa*. All the requirements alike of the determinist and of the free-will hypotheses are thus satisfied by a synthesis which comprises them both in one. Mr. Romanes afterwards reviewed the opinions of the late Professor Clifford upon this subject, and concluded by observing that if it were true that the voice of science must of necessity speak the language of agnosticism, at least let them see to it that the language was pure; let them not tolerate any barbarisms introduced from the side of aggressive dogma. So would they find that this new grammar of thought did not admit of any constructions radically opposed to more venerable ways of thinking, and that the often-quoted words of its earliest formulator applied with special force to its latest dialects—that if a little knowledge of physiology and a little knowledge of psychology incline men to atheism, a deeper knowledge of both, and still more a deeper thought upon their relations to one another, could only lead men back to some form of religion, which, if it be more vague, will also be more worthy than that of earlier days.

ANTHROPOLOGY.¹

FURTHER CONFIRMATION OF THE POST-MORTEM CHARACTER OF THE CRANIAL PERFORATIONS FROM MICHIGAN MOUNDS.—In a paper entitled, "Burial Customs of our Aborigines," read by the writer before the Ann Arbor meeting of the American Association, August 28, 1885, two fragmentary crania, recently exhumed from a mound on the Detroit river, Michigan, and presenting good examples of the peculiar custom of cranial perforation, were exhibited as illustrations in the anthropological section. The cephalic index of the first specimen would throw it into the medium or orthocephalic group, or to follow the nomenclature of Professor Broca, the mesaticephalic division. The single circular perforation occupies, as usual, a central position at the vertex of the skull, being situated on the sagittal suture, about 0.6 of an inch back of its junction with the coronal suture. The perforation is 0.4 of an inch in diameter, and was probably made in the same manner as were all those I have seen, by a rude stone implement rotated by hand.

The second specimen is evidently not of as great antiquity as

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the first. Its fragmentary condition, the entire occipital bone and parts of the parietal bones being wanting, prevents most of the usual measurements being taken; but though a smaller and narrower skull than the first mentioned, its cephalic index would, doubtless, place it in the same range, viz., that of the mesaticephali. It is, however, most interesting in presenting the unusual feature of having two perforations. The smaller of these, less than 0.4 of an inch in diameter, is situated on the sagittal suture, and about 0.1 of an inch back of its junction with the coronal suture. The second perforation is over 0.4 of an inch in diameter, and is placed on the frontal bone, in a straight line with the direction of the sagittal suture and 0.35 of an inch from its junction with the coronal suture. The perforations from center to center are 0.8 of an inch apart.

In my examination of these specimens I have made the important discovery that the perforations in both of them are countersunk, or made from both sides—from the inside as well as the outside of the skull. The beveled edges unquestionably settle this point, and are a further confirmation, if any such were required, as to the perforations being *post mortem*. This is a point overlooked by me in my previous studies, and, indeed, doubtless is wanting in the perfect crania, where the perforations could not well have been made except from the outside of the bone.

These two specimens present many of the characteristics observed by me in other crania I have taken from our mounds. In the second and narrower skull the outlines of the orbital cavities, wanting in the first and larger cranium, are decidedly quadrilateral; the frontal protuberances are less pronounced, and the glabella, which in the first specimen is replaced by a slight depression between the superciliary arches, is represented by the usual swelling. The first skull, which, as I have already stated, is the more ancient of the two, is further distinguished by having a small though decidedly developed epactal bone. This bone, sometimes called the "bone of the Incas," from its prevalence in ancient Peruvian skulls, I have already called attention to as occasionally pertaining to the more ancient crania from our Michigan mounds; and also to a certain inclination (if I may so describe it) to produce this bone, as though at one time some ancestors had possessed this distinctive characteristic, but that the peculiarity was gradually eliminating in the later generations, possibly through intermixture with other races.

Both of the specimens seem to have belonged to male adults, as do all others of the perforated skulls which I have observed.—*Henry Gillman, Detroit, Michigan.*

PILLING'S BIBLIOGRAPHY. — The most valuable work as yet issued by the Bureau of Ethnology is a volume bearing the following title: Proof sheets of a Bibliography of the Languages of North American Indians. By James Constantine Pilling. (Dis-

tributed only to collaborators.) Washington: Government Printing Office, 1885. [pp. 1135, gr. 8vo.] This work was commenced by Mr. Pilling several years ago, and with unflagging and systematic assiduity prosecuted amid the distractions of a laborious and exacting Government appointment. In the first place the sources of information have been exhaustively consulted from Adelung to Williams. The feeling of security and confidence is at once awakened on one's finding that the catalogues of Adelung and Vater, Alcedo, Andrade, Asher, Bartlett, Berendt, Boturini, Brinley, Brinton, Clarke, Field, Icazbalceta, Ludewig, Ramirez, Sabin, Steiger, Trumbull have all been exhausted and their personal aid in many instances has been secured. The rules of cataloguing adopted by the consensus of leading libraries have been carried out, so that in this case we have an alphabetical list of persons or societies that have written in or upon the Indian languages of North America, with full and accurate titles of all editions of their writings. This is not all. Every page of the work furnishes brief abstracts of works, the author's own statement of his purpose in his work, the annotations of distinguished critics who were conversant with the several languages. Mr. Pilling has also kept a record of his own difficulties in finding many of the publications recorded, so as to make the task of hunting, which was extremely laborious to him, easy to those who come after him. Finally, no one is omitted. If he is, it is because he has been hiding, and it will be necessary only to know of his existence to drag him into publicity in the final issue. The error is really on the other side, and many titles are included for trivial reasons. Major Powell receives from the author and richly deserves the highest commendation for the encouragement which he has given. There is, perhaps, a little too much mutual admiration between patron and author for a work of such magnitude. This is carried to a ridiculous extent when over thirty pages are given to members of the Bureau of Ethnology, one page to the Smithsonian Institution and three inches to W. W. Turner. It is to be hoped that all who are interested in American philology will call Mr. Pilling's attention to works on American Indian languages which are in the least danger of escaping his observation.

THE MOUND-BUILDERS AND THE HISTORIC INDIANS.—A very remarkable treatise upon this subject appeared last year in *Kosmos*, and now comes to us in a separate pamphlet, from the pen of Dr. E. Schmidt of Leipzig. The author starts out with the assumption that most American archæologists see in the builders of the mounds a definite ethnological unit, differing from the historic Indians in their anatomy but more in their culture. These mound-builders peopled in compact settlements the Mississippi valley, ruled by despotic government, worshiping the sun with human sacrifices in temples and altar-places, and living upon the

productions of agriculture. They were advanced in the art of spinning, weaving, metallurgy and ceramic. They fortified themselves with circumvallation and buried their dead in mounds. A cataclysm cut off these people from the historic Indians who are absolutely new-comers upon the soil, as were the whites who succeeded them. Now Dr. Schmidt holds that the same revolution of sentiment which has substituted in geology a gentle and gradual evolution for the preceding notion of sudden breaks in creation will also take away the theory of mound-cataclysms and prove the continuity of social history on our continent.

One of the favorable symptoms of this change of opinion is the substitution of mound-anatomy, ochthotomy, for the older process of mound-rummaging. The *NATURALIST* defines anthropology to be the application of natural history methods and apparatus to human phenomena. Mound-anatomy is the application of the methods of the biological laboratory to the examination of a mound. Dr. Schmidt, after giving a good résumé of the distribution and classes of mounds, in which he always eliminates the marvelous, the extraordinary and the mythical, follows very closely Professor Putnam in his latest researches. "In truth," says he, "the mounds tell us nothing of the political organization of their builders, the sacrificial mounds are nothing more than burial tumuli for cremation. We make an absolute step in knowledge when we say that we know nothing of the sociology and religion of the mound-builders." Furthermore, in studying the geographical distribution of mounds, it is seen that special types characterize given areas. It is not to be supposed that one people acted so differently without the motive of great climatic variation. These types of remains speak of different peoples who developed their several ideas. The thousand and one perishable things that have fallen victims to time and fire more definitely expressed this separation, and the things that remain are like the few words in common throughout the Aryan tongues, telling of a common origin further back. The crania of the mound-builders are, for the most part, artificially deformed, as are those of many modern tribes of America. The time of these peoples extends from many centuries before Columbus far into the historic period of the continent.

On the other hand, when we seek to compare the mound-builders with the modern Indians, we find our ignorance almost as profound respecting the latter. Nothing is more unjust than to place in opposition an exaggerated view of the former with the most degraded types of Indians. In New England, New York, Pennsylvania, Virginia, all through the South, the early settlers were actually kept from starving by the aboriginal maize fields. In all of these self-same localities were fortifications, circumvallations, fossettes, platforms, as among the mound-builders. Did the mound-builders trace animal forms in earth? the Indians

of New Mexico paint their altars in colored sands to-day. The terraced mounds, cremation, ossuaries, stone mounds, deposit burial, art productions for peace or war, traditions of the great Eastern stocks are all ably examined by Dr. Schmidt, and wonderful parallelisms pointed out.

Finally, relying greatly upon Mr. Hale's "Indian migrations as evidenced by language," the author revives the story of the Allegewi. There's the rub. The number of American archæologists who believe that the mound-builders were not Indians at all is very small. We have never seen one. There are all grades of believers in the amount and quality of relationship between the mound-builders and historic Indians; but which mound-builders and which historic Indians, that is quite a different thing.

THE NATIVES OF NEW GUINEA.—It is usually stated that two types of man exist in New Guinea; the one Melanesian, or so-called Papuan (which prevails from Flores to New Caledonia and Fiji), occupying the bulk of the country; the other, a fairer, milder race, having decided affinities with the Polynesian, found on the south coast of the eastern peninsula. Members of the former division, however, differ widely in appearance in different parts of the island. Not only have they in some instances undergone great admixture, as, *e. g.*, on parts of the north coast, where the type has been refined by mingling with a superior and possibly immigrant strain, but elsewhere, in the interior and on the coast, as at Sorong in the north-west and on the east side of Geelvink bay very degraded types are found. The fairer race show signs of great admixture and deviation from the Polynesian type. The Papuans preserve the heads of enemies and the skulls and jaw-bones of relatives. The "great house," many hundred feet long, and containing several families, is found in New Guinea, as in Borneo and among the Mishmis and Nagas of Assam; the last-named having also, like the Papuans, separate houses for bachelors, and, unlike them, others for maidens. The Malay practice of building on piles is also common throughout New Guinea, even high up on the mountain sides. In the south-east stockaded villages are built on the steep spurs of hills, surmounted by a *dobbo*, serving as a watch-tower and as a refuge from human and spiritual enemies. Houses are also built on the ground with low walls and projecting eaves. In some places are larger houses, ornamented outside with figures of birds, etc., which seem to correspond to the council-house. The Papuan is a savage of a high order. Although still in the stone age the artistic faculty is shown in the carvings on canoes, houses, implements and weapons. They are fond of flowers. They trade massoi bark, nutmegs, bird skins, pearl- and tortoise-shell, trepang and slaves for cotton cloth, iron and copper ware, knives, beads, mirrors, indigo and arrack.—*C. Trotter in Proc. Roy. Geog. Soc., vi, 196.*

THE MARL BEDS OF KUNDA.—Professor C. Grewinck, in the University of Dorpat, has written a pamphlet of seventy-two pages on the marl beds of Kunda, in Estland, Province of Livonia, on the Gulf of Finland, Russia. The marl beds are three versts from the sea, between the town and the River Kunda. The first portion of the pamphlet describes the geologic features of the locality. From page twenty to the end an account is given of the bones of vertebrates and the bone implements found in the marl. The animals include *Equus caballus*, *Bos taurus*, *Cervus alces*, *Cervus capreolus*, *Cervus tarandus*, *Sus scrofa*, *Canis familiaris*. The horse and ox are most common, and are found as well in the marl as in the bog, generally gnawed. The bone implements are mostly harpoon points and piercers, and the position of the pieces is accurately described.

ANTHROPOLOGY IN JAPAN.—[Trans. As. Soc. of Japan, XI, pts. I and 2, XII, pt. 1].—*Food-plants in Japan*.—Mr. Edward Kinch, in the Transactions of the Royal Society of Japan, vol. XI, pp. 1-38, presents a tabulated list of the food-plants of Japan. The systematic name, the Japanese name, and, in many cases, the English name is given. The author also states the part of the plant that is useful, the use to which it is put, and any interesting facts known. Dr. Geerts makes some observations on this list and draws attention to Siebold's "Synopsis plantarum œconomicarum universi regni Japonici," Trans. Batav. Soc. of Arts and Sc., XII, and to Dr. S. Syrski's article on Japanese economic plants, pp. 175-220, in von Scherzer's *Fachmanuische Berichte*, etc., Stuttgart, 1872.

Ainos of Tsuishikari.—Tsuishikari is a hamlet in Sapporo, twelve miles east of the city. The Ainos who people it are a colony from Sagalin that, in 1875, at the invitation of the Japanese government, left their native island. From 1863-1875 Japan was engaged in settling with Russia her frontier in Sagalin, and ended by exchanging for the Kuriles. In 1875 she granted lands on the Ishikaro to her Sagalin subjects. Seven or eight hundred came and built their straw huts. These Ainos are fishers and live on fish, rice and pounded lily roots. Hunting the bear is their glory, and they will attack the animal with a bow and a knife. The men are fine looking, and no hairier than many Englishmen. The women and girls tattoo the cheek with the juice of the haba tree. The dress of both sexes is gaudy and not unlike. The weapons are the bow, sword, and dagger. The women smoke more than the men, and are also the musicians, playing the Jew's harp, the harp, and a two-bridged harp (*ton-kare*). Their houses are no better than our Indian huts, and interiorly are furnished like them. All their home-made vessels are of wood. Bear cages are a constant adjunct for raising cubs, whose Aino mistresses suckle them when they are very young. These

home-bred bears are killed at the bear festival in September. The system of consanguinity and affinity is not well worked out. When an Aino dies, bowls of water and rice are placed by the corpse for two or three days. The body is placed in a wooden box with a pan, a cup, a sword, and a gilt rod. The burial is very retired, and the hut is not burned; on the contrary, it is allowed to remain as the residence of succeeding generations. They worship deities innumerable, every natural object furnishing one. The medicine man does not differ from the same functionary in all other tribes of their *gradus*.—Mr. J. M. Dixon, in *Tr. As. Soc., Japan, XI, 39-50*.

Japanese Tea.—Part I, vol. XII, pages 1-32, plates 1-XXI, is devoted to a monograph on the preparation of Japan tea. By Henry Gribble.

ANTHROPOLOGICAL NEWS.—Professor F. W. Putnam draws attention to the following extract from the *American Journal of Science*, XLIV, 1843, p. 302, written by Dr. John T. Plummer of Richmond, Wayne county, Ind.: "A tusk [of the mastodon or mammoth] was exhumed from the gravel, fifteen feet below the surface, while excavating the Whitewater canal near Brookville, thirty miles south of Richmond; a club-shaped implement, formed apparently of cliff limestone, was also taken out of the gravel ten feet below the surface, near the spot where the tusk was found."—A writer in *Science* draws attention to the following sources of information respecting the aboriginal languages of S. America:

Professor Friedr. Müller in *Grundzüge der Sprachwissenschaft*.

Lucien Adam in *Examen grammatical de seize langues américaines*, Genoa, 1882.

Dr. Julius Platzmann in *Glossar der Feuerländischen sprache*.

Giacomo Bove in I Fuegini, secondo l'ultimo suo viaggio, Parte prima, Genova, 1883.

John Luccok, *Grammatical elements and a vocabulary of the Tupi language or lingoa geral, of Brazil*, Rio Janeiro. H. Laemmert & Co., 1882.

Dr. Julius Platzmann, fac-simile edition of Havestadt's book of Chilidúqu [see *Science*, III, 550].

R. B. White, A short ethnographic and linguistic study of the Indians of Antioquia and of the Cauca valley, U. S. Colombia.

J. Anthropol. Inst., &c., 1884. [Contains vocabularies of the Noánama and Tadó dialects of the Choco family].

Edwin R. Heath, *Vocabularies of Canichana, Cayuába, Mobíma, Mosetería, Pacavára, Marópa and Tacana languages of Bolivia*.

Braz da Costa, *Vocabulos indigenas e outros introducidos nouzo vulgar*. [Foreign and Indian words introduced into the Portuguese of Brazil.]

A. H. Keane, On the Botocudos, also called Aímorés, J. Anthropol. Inst., Nov., 1883. *Botocudos* means "those wearing the lip ornament."

J. J. von Tschudi, *Organismus der Kechna sprache*, Leipzig. F. A. Brockhaus, 1884, pp. 534.

Giovanni Pelleschi, *Sulla lingua degli Indiani Mattacchi del Gran Chacco*, Frieenze, 1881.

F. di la Carrera, *Arte de la lingua Yunga*, Lima, 1880.

—S. Carlos von Koseritz has published "Bosquejos Ethnologicos," a series of papers contributed by him in the last three years to the *Gazeta de Port Alegre* on anthropological subjects in the province of Rio Grande do Sul and other parts of Brazil. Stone implements of a strictly Palæolithic type appear to be very rare in von Koseritz's collection, and as they occur promiscuously with Neolithic objects, the author infers that it is impossible to determine a Palæolithic antecedent to a Neolithic age in Brazil. Many pieces were found associated with the remains of the Megatherium, "*Rhinoceros tichorinus*"(!) and the cave bear. But a skeleton recently found in a shell mound on the banks of a fresh-water lagoon near Cidreira, three miles from Rio Grande, convinces the writer that the early inhabitants of South Brazil were of a lower type than the Charruas and others in possession of that region in the historic period. The Botocudos of the Aimores mountains have more nearly the features of the Cidreira cranium (*Nature*, Aug. 21, 1884).—Those who are interested in the subject of the *jus prima noctis* will find it thoroughly discussed by Dr. Karl Schmidt in *Zeitschrift für Ethnologie*, xvii (1884), pp. 18–59. The author seems to be familiar with the literature of the subject, and gives innumerable references to authorities, ancient and modern.

MICROSCOPY.¹

A MEANS OF DIFFERENTIATING EMBRYONIC TISSUES.—It may be safely assumed that all hardening and staining fluids possess, in a higher or lower degree, the power of *developing*, in the photographer's sense, histological distinctions between embryonic cells, long before these distinctions become manifest in perceptible morphological differences. It is evident, also, that this differentiating action varies in strength according to the conditions under which the reagents are applied. Our knowledge of the ways and means of controlling this action is still very meager; but it is sufficient to show that the histological technique of the future has much to hope for through experimentation in this direction. One of the best ways of intensifying the differential effects of hardening fluids, is to use several of them in combination or in sequence. The use of osmic acid, followed by Merkel's fluid, is an example of this kind. The advantages of this method in the study of pelagic fish eggs have already been noticed,² and I wish now to state briefly what the method will accomplish when applied to the eggs of Clepsine. The mode of procedure is as follows:

The eggs are placed in $\frac{1}{4}$ per cent solution of osmic acid for ten minutes, then rinsed in clean water and transferred to

¹ Edited by Dr. C. O. WHITMAN, Mus. Comparative Zoology, Cambridge, Mass.

² AMERICAN NATURALIST, Nov., 1883, p. 1204, and Proc. Am. Acad. Arts and Sci., xx, p. 28, 1884.